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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,020	04/08/2004	Kon-Tsu Kin	KINK3006/EM	7561

23364 7590 08/24/2007  
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ALEXANDRIA, VA 22314

EXAMINER

MENDEZ, ZULMARIAM

ART UNIT	PAPER NUMBER
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1753

MAIL DATE	DELIVERY MODE
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08/24/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/820,020

**Applicant(s)**

KIN ET AL.

**Examiner**

Zulmariam Mendez

**Art Unit**

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05/29/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halldorson et al. (US Patent no. 6,358,398) in view of Knieper (US Patent no. 6,238,546).

Regarding claim 1, Halldorson teaches a wastewater treatment apparatus to perform electro-coagulation and advanced oxidation processes. The electro-coagulation involves the use of an electric cell (42), which is disposed within the reservoir (14) containing the oxidant material (abstract; see figure 4 which shows this cell configuration, referred to as cell (42) hereinafter). The process comprises: an intake tube for introducing influent water from a tank (40) and pump it through a venturi device (16) into the bottom of the cell (42); an outlet tube (see figure 4) for venting processed

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water from a top of the tank; an input (18) for introducing oxygen-containing gas into the tank, a mixing device (see figure 21) which enhances the process by assisting in the interaction of the gas and the aqueous solution throughout the tank (col. 15, lines 14-25). Furthermore, the wastewater from tank (40) and the gas are mixed at the bottom of the cell (42) when passing through venturi (16). Referring now to figure 23, a sealed tank/reactor (190/42, as shown in figure 4), may have a metal body, or a metallic material mounted on an inner wall thereof, for use as a cathode (198, 200); a sacrificial electrode used as an anode (202) which is disposed in the tank and non-electrically connected to the cathode (anode includes a non conductive mesh or screen member (206)); a direct current supply (60) having a positive electrode electrically connected to the anode and a negative electrode electrically connected to the cathode.

However, Halldorson fails to teach a gas-liquid separator which is in fluid communication with the tank at the top of the tank for expelling a gas from the tank without water expelling.

Knieper teaches an electrochemical treatment of effluent water to remove suspended solids and dissolved particles (col. 1, lines 9-11). Contaminated water is pumped into electrocoagulation units (10,120; see figures 2 and 10) for treatment and oxidation occurs at the anode (26) (col. 5, lines 12-17). A chamber (38) is formed at the top of the cell (10), as shown in figure 4. This chamber (38) receives water as it leaves the treatment section (20) of the cell (10) in a vertical direction and gases from the electrical treatment may be captured and vented from the vertical flow in small amounts. The chamber (38), besides of acting as a gas-liquid separator, also serves to equalize

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pressure within the system and minimize the swelling effect caused by the electrical treatment (col. 4, lines 31-46).

Therefore, one of ordinary skill in the art would have been motivated to use the gas-liquid separator at the top of the treatment chamber, as disclosed by Knieper, in the wastewater treatment apparatus of Halldorson in order to allow gases to escape from the chamber as well as to equalize pressure within the system and minimize the swelling effect caused by the electrical treatment.

Regarding claim 2, the reactor of Halldorson comprises an oxidant supply device (18) mounted on the intake tube (See figure 4).

Regarding claim 3, Halldorson teaches a wastewater treatment apparatus where the oxidant supply device (18) includes a venturi (16) in fluid communication with the intake tube for introducing influent water into the bottom of the cell (42).

Regarding claim 4, the sacrificial electrode as taught by Halldorson is made of stainless steel (col. 16 lines 27-29).

Regarding claim 5, Halldorson fails to teach that the sacrificial electrode is made of iron. However, Knieper teaches electrodes which can be made of different materials, including iron depending on the characteristics of a particular waste system (col. 5, lines 39-51) in order to improve the redox equilibrium due to the breakdown of water molecules at the electrodes. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to replace the stainless steel electrode of Halldorson with the iron electrode of Knieper in order to improve the redox equilibrium due to the breakdown of water molecules at the electrodes.

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Regarding claim 6, the reactor of Halldorson is made of stainless steel (col. 16 lines 2-6)

Regarding claim 7, the mixing device of Halldorson, to maintain the performance of the overall cell, comprises perforated dishes mounted upon an auger profile rod, as shown in figure 21, for further enhancement of the oxidation/flocking process, to transport fluid within the cell and assist in the countercurrent interaction of dissolved gas and aqueous solution (col. 15, lines 14-25).

Regarding claim 8, the gas liquid separator, as disclosed by Knieper, further comprises a valve (47) to allow gases to escape (col. 4, lines 45-46).

### ***Response to Arguments***

4. Applicant's arguments, see page 5, filed in May 29, 2007, with respect to the rejections of claims 1-4 and 6-7 under 35 U.S.C 103 (a) as being unpatentable over Halldorson et al. in view of Pollock have been fully considered and are persuasive. The applicant argues that the Halldorson reference teaches a two-stage system having a pressure discontinuity between the two stages to induce hydrodynamic cavitation. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made above.

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**Conclusion**

5. Due to the new grounds of rejection presented in this Office Action, this document has been made non-final.
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zulmariam Mendez whose telephone number is 571-272-9805. The examiner can normally be reached on Monday-Thursday, 8:30am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ZM *3m*

  
ALEXA D. NECKEL  
SUPERVISORY PATENT EXAMINER